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ABSTRACT

This practicum was designed to assist the personnel of a middle school in becoming aware of the potential educational benefits of computers and computer networks (specifically, local area networks, or LANs). An introductory presentation concerning the importance of technology in education was followed by 10 inservice training sessions. The classes met weekly, on-site, with cooperative learning used as a teaching strategy. The curriculum was developed with consideration given to state mandates regarding objectives; pre- and post-assessment was administered; and training materials for participants and a grant to a local foundation for teaching stipends was prepared. All practicum objectives were met. Each participant scored 80% or better on the post-assessment, all hands-on computer activities were completed, and frequency of computer lab usage exceeded expectations. The success of the practicum suggests that the design of the inservice training is an effective strategy. Recommendations and a detailed implementation plan are included. Eight appendices include copies of the questionnaires used for a teacher survey, the test used for the pre/post assessment, a courseware evaluation form, and the Teacher Education Center evaluation form. (Contains 22 references.) (Author/ALF)

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IMPROVED COMPUTER TECHNOLOGY SKILLS FOR A MIDDLE SCHOOL FACULTY THROUGH INSERVICE TRAINING

by

PATRICIA LONGWELL BYERS

CLUSTER XXXX

A Practicum I Report presented to the
Ed. D. Program in Child and Youth Studies
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

NOVA UNIVERSITY

1992

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This practicum report was submitted by Patricia L. Byers under the direction of the advisor listed below. It was submitted to the ED. D. Program in Child and Youth Studies and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova University.

Approved:

May 2, 1992
Date of Final Approval of Report

William Anderson
William Anderson, Ph.D., Advisor

WILLIAM ANDERSON

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ABSTRACT

Improved Computer Technology Skills for a Middle School Faculty Through Inservice Training. Byers, Patricia L., 1992. Practicum I Report, Nova University, ED.D. Program in Child and Youth Studies. Descriptors: Computer Literacy/Computer Managed Instruction/ Computer Networks/Computer Uses in Education/ Cooperative Learning/Educational Benefits/ Educational Opportunities/Inservice Teacher Education/ Middle Schools/Peer Coaching/Professional Development/ Staff Development/Teacher Improvement/Teaching Methods.

This practicum was designed to assist the personnel of a middle school in becoming aware of the potential educational benefits of computers and computer networks (LAN's local area networks). An introductory presentation concerning the importance of technology in education was presented followed by ten in-service training sessions. The classes met weekly, on-site, with cooperative learning used as a teaching strategy. Participants completing the training received 30 in-service credits from the district Teacher Education Center. An optional 10 hours were available to participants choosing to form cooperative coaching pairs designed to implement newly learned skills.

The writer developed the curriculum,consideration being given to state mandates regarding objectives; administered a pre- and post-assessment; prepared training materials for participants; co-taught the classes, and prepared a grant to a local foundation for teaching stipends.

All practicum objectives were met. Each participant scored 80% or better on the post-assessment, all hands-on computer activities were completed, and frequency of computer lab usage exceeded expectations. The success of the practicum suggests that the design of the in-service training is an effective strategy; recommendations and a detailed implementation plan are included.

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CHAPTER I

INTRODUCTION

Description of Work Setting and Community

The setting of the middle school used for this practicum is part of a county school system located in the southeastern United States. The community itself has as its western border a large body of salt water and is graced with beautiful white sand beaches which contribute to its appeal as a tourist area.

The population of the community is approximately 50,961 while the county is estimated to have 277,776 residents according to 1990 census (United States Department of Commerce [USDC], 1991). The population fluctuates depending on the season of the year, with the winter months bringing a heavy influx of tourists. Another significant population fact is that people over the age of 64 comprise 54% of the population (USDC, 1991).

The main industry of the community is tourism with the majority of people being employed in service industries or government as it is the county seat. There are a small number of technological instrumentation corporations that have located in the community in recent years supplanting the boat building industry which is in a state of decline due to the economy.

The school, part of a county-wide school system which includes 35 schools, is located in the eastern part of the county. When the school was built in 1962, it was off the main thoroughfare in a ranching and farming community. In fact, the 111 acres for the school was deeded to the school board by a local rancher. In return for the land, the school board had to stipulate that an on-going vocational agriculture program would remain in existence.

The setting of the school has changed dramatically over the years with the population growth. In the early years, new growth was located in the western part of the county close to the lovely beaches. As all available land was used in that area, growth moved to the eastern and southern areas of the county. As a result of this growth, the area that the school serves is now located in a rapidly growing area.

Many families new to the community move to the area served by the school as it is one of the few sections of the community with affordable housing. Rental housing, at a premium in the county, was recently expanded by the opening of two large complexes both located within a mile of the school. This availability of affordable housing has been a contributing factor to the overpopulation of the writer's school. The facility is projected for approximately 1150 students for the current 91-92 school year and 1300 by 1994. The optimum size for a middle level school is 1000 students.

The socio-economic mixture of the school is rather

unique. The combination includes about 15% of the school's population being bussed in from the urban black area, about 40% of the students being from middle and upper class homes, and the remaining 45% of the students coming from the rural farming areas. Originally there were few residential areas in the school's district: the school population was mainly from the black urban area and the farming community. This mixture has changed dramatically over the last 15 years with the building boom.

Due to the size and location of the school, about 90% of the students are bussed. This situation poses unique problems as far as students staying after school for activities or extra help. It is also a problem for parents who do not drive or own automobiles. These factors tend to make the school rather isolated, despite the addition of a public bus stop at the school in the past year.

The school has been a middle school serving grades six through eight for the past nine years. Prior to that time, it was a junior high school serving grades seven through nine. The school is a true middle school model with the following characteristics: block scheduling, inter-disciplinary teaming, and daily blocks of time for teachers to do team planning together and advisor/advisee activities with the students.

Writer's Work Setting and Role

The writer's role presently is that of teacher of English on an inter-disciplinary team at the eighth grade level. Additional duties include that of English department curriculum coordinator, eighth grade team leader, Faculty Council member, and Technology Committee member.

As an aspiring administrator, the writer is also a member of the county pool from which assistant principals are chosen. This has led to being used as a substitute administrator on occasion.

The writer is active at the district level as a participant on committees and as a certified teacher trainer in the areas of needs and characteristics of the middle school, critical thinking strategies, and cooperative learning techniques. Much of the writer's experience at the school and district level provides input at the community level on a task force concerned with the status of children and youth.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

The writer's team, consisting of the four basic skills curriculum coordinators, was formed during the 1990-91 school year to pilot a special technology program for the school system. This pilot consisted of thirty student computers linked together in a local area network (LAN).

In order to fully understand the network or LAN, the reader must have some background information. The definition of the word network or the verb networking as it is used in this proposal is: the communication or linking between two or more computers. Through this linking, made possible by a central server computer, multiple computers can share such things as software and printers. The system also enables computer users to send and received information that they have created to people using other computers in the network.

The software used with the system is stored on the larger "central" computer with a tape back-up to prevent loss of material due to power problems. This central system is the basis of the main advantage of local area networks (LANs): the most efficient use of computer resources.

The school's particular network system can support up to 80 computers. The team's computers are not only networked together but are also networked to the school's main office and to the county's district office. The uniqueness of the system, the first in the country to have this capacity, has resulted in many observations by educators, administrators, and IBM personnel from all over the United States and Canada. Due to the success of the network pilot program at the writer's school, two other schools currently being built in the writer's district will have the same system installed (see Appendix A and B for complete information on the pilot).

This leading edge of technology is not without its problems. Many faculty members at the writer's school were unaware of the potential educational benefits of this networked system. The advantages and operation of the system were not well understood. To compound the problem, existing individual personal computers available for teacher and student use were not being used adequately or wisely.

There seemed to be multiple reasons why the problems existed with no solutions prior to the practicum. First, there was practically no technical support available when teachers wanted to use computers. Teachers were also extremely busy during the school year with little time or energy to do anything but necessary tasks. Even if there was more time, infrequent training was available on the use

of regular computers. When the few courses were offered, they were always in another location which is an inconvenience. There had been no training available in the school district on the use of the network computers, with the exception of the writer's team of teachers who were trained by IBM (International Business Machines), the manufacturer of the computers. Finally, as a consequence of the above-mentioned items, there was little awareness of existing software for either kind of computer.

In conclusion, the advent of technology is changing the world, and educators must prepare students for this information based society through adequate training in computer technology. The educators themselves must be aware of the latest technology, and must be versed in the operation of the equipment so they can in turn adequately prepare their students for the present and the future.

In order to accomplish the afore-mentioned goal, the following problems were addressed in this practicum at the writer's school: faculty members being unaware of the potential educational benefits of networked computers and existing stand-alone computers, and available software programs not being used wisely or adequately.

Problem Documentation

Evidence that this problem existed was documented in several ways. A brief history of a computer laboratory told

from the writer's personal observations is needed for background information. In 1986, the school installed a new computer lab exclusively for the use of the English department.

In-service training for the department members was held for one day, being provided by school district support personnel. In a collaborative effort, the English department developed guidelines and student rules for the use of the lab and chose word processing software for use in the laboratory. That year the lab was rarely used. As a result of infrequent use, during the following year the lab was no longer limited to the English department: any teacher could use it. Again there was infrequent use of the lab. Consequently, beginning in 1988, the lab was disassembled with the computers being signed out to individual teachers as requested.

Further evidence of the problem was obtained in May of 1991, when the School Technology Committee, in collaboration with the faculty, compiled a list of needs and goals. Included on this list was the need for training on the network and for teaching strategies using the computer (see Appendix C for the complete list).

As a follow-up activity to further assess the need for training, the writer distributed a questionnaire to faculty members (see Appendix D for complete questionnaire). The results of the survey indicated the following: 7 out of 24

people surveyed could correctly list one benefit of a networked computer. In response to another question, 21 out of the 24 faculty members indicated a desire for training on the network system.

A series of interviews were held with the media specialist who was the overseer of the original lab and who will have the same responsibility for a new lab being installed during the 1991-92 school year. The following problems were mentioned: in the original lab 11 out of 60 faculty members were regular computer users while three other teachers used the lab if the media specialist remained with them for technical assistance and support. The opinion expressed by the specialist as to why the lab wasn't used was lack of adequate training. She also indicated that the computers assigned to individual teachers during the 90-91 school year were not being used. These computers have been taken from individual teachers' rooms and assembled in the new lab.

Causative Analysis

There are many problems associated with educators and the use of computers. Many teachers feel that computers have been thrust upon them in an unfair manner. Indeed it does seem that in many schools, it has been a case of putting the computer before the teacher. Computers appeared

in the classroom and teachers were expected to begin using them with only the perfunctory course in computer literacy.

It was the personal observation of the writer that not only were teachers inadequately trained, but they didn't have the technical support necessary to make them feel comfortable with this new entity. This in turn made them fearful of appearing inadequate in front of their colleagues and students.

Few faculty members were aware of the software at the school as no logical cataloging or referencing to subject areas had been done with what is available. While some of the software is outdated and not desirable, some of it is very good. Fortunately many excellent networked software programs have become available and been purchased by the school in the last year. Faculty members needed only to become aware and trained in the use of this software.

Time is of the essence with most teachers. There are never enough hours in the day, and consequently a great amount of work is done after-hours in the home setting. Many teachers do not own personal computers, putting them at a great disadvantage as learning computer skills is very time consuming. Some of it can even be self-taught if one has the availability of a computer, possession of a good manual, and infinite patience. Availability is of the utmost importance if one is going to learn by any method. Availability is absolutely vital if the person is taking a

computer training class so that what is being learned can be practiced.

A final issue is the advent of the networked computer system. While operating on the same principal as stand-alone personal computers, it has so much more potential for students and teachers alike. Since it was so new in the writer's school, most faculty members had received little information about it and were not aware of the potential available.

In a further attempt to investigate why more faculty members didn't use computers, the writer formulated a questionnaire for that expressed purpose. It elicited information about the computer comfort level of each individual (see Appendix D for the complete questionnaire).

Relationship of the Problem to the Literature

Educators are preparing tomorrow's leaders and members of the work force. The whole crux of the educational system is to prepare students to become functioning members of a democracy, ready to meet the timely challenges of living in the world as it is when they emerge from their formal education. As John Dewey (1987) summarized in an explanation of democracy in society and schools: the need is for the creation of a democratic, social, and learning environment that maintains a maximum degree of continuity between life inside and outside the school.

We live in a rapidly changing world. The advent of technology is literally changing the world as we know it. We are on the threshold of a new global economy, the movement from an industrial economy to an information-based economy. Even the very vocabulary in the English language is reflective of this with terms such as: bytes, laser discs, mouses, video disk players, and CD-ROM.

There are many ramifications of this new global economy. In the United States and worldwide, we are looking at an entirely different job market. Bissonnet (1990) estimated that 75% of all workers would need retraining by the year 2000, and that all workers new to the job market would have an average of four careers, two of which are not even in existence yet!

Sculley (1990) even suggests that businesses want to compete in this global economy but are unable to because of a basically uneducated workforce. He also estimates that $30 billion dollars a year is presently being spent on remedial training in the workforce.

Former Secretary of Labor, Ray Marshall (1990), said that we have three options available in meeting the demand for the needed workforce. Option one is to continue producing unskilled but literate workers. The functionally illiterate workers--Marshall's second option--are in the workforce and can be seen at any fast food chain. These people are working, using the latest technology to

compensate for their lack of skills. These employees have a cash register, not with numbers representing prices but with pictures of the food being ordered. The prices are automatically rung up via computer chips. The last and most desirable option that Marshall refers to is having a well-educated workforce using leading-edge technology.

Kelly (1990) indicates that the educational system has to be literally transformed in order to teach basic skills necessary for success in America. According to O'Donnell (1988), since we are becoming an information-based society, we have to educate our students in the ability to locate, access, and manage information. Numerous authors agree that all of these skills can best be met through the effective teaching of computer skills, augmenting all the various disciplines.

Before computer or technology skills can be taught in our schools, the teachers have to be prepared to do it. There are many problems associated with educators and the use of computers. There is also a lurking fear that computers will take over teacher's jobs. As O'Donnell (1988) states, teachers need the assurance that computers will not take over, but that they (the computers) can make teaching more rewarding by allowing more time for interaction with the students and less time spent shuffling papers.

Another very real fear among educators is that of appearing inadequate in front of their students and colleagues. Teachers reason that they are the instructors and to be less than proficient in a skill is very uncomfortable. Perhaps this is to some degree a fault of management. Robbins (1988) cites risk tolerance as being an important characteristic of organizational culture. He describes it as the extent that employees are encouraged to be innovative and seek to take risks. In most schools, teachers are not rewarded for being aggressive and taking a chance; in fact, the opposite is often true.

Woodhouse and Jones (1988) cite four reasons why computer activities are still not a normal occurrence in classrooms. The first constraint is lack of facilities. Computers are usually housed in a special room in the school and are therefore more difficult to integrate into classroom instruction. If computers are in the rooms, it is usually only one or two with very little appropriate software.

Along with a lack of facilities, a second important characteristic is missing--that of support (Woodhouse & Jones, 1988). There is a dearth of supporting services available for those teachers who are willing to try using computers. Robbins (1988) defines support as the degree degree of assistance and warmth that managers provide for subordinates. Robbins goes on to say that without this support, risk tolerance will be low: people will be less

innovative and less willing to take risks if the proper support is not available.

The third constraint indicated by Jones and Woodhouse (1988) is lack of knowledge of instructional strategies. Teachers have great difficulty trying to tie the use of the computer with the traditional lecture approach to teaching that many have been using for years. Interestingly enough, Woodland (1984) indicates, after a study of 1000 classrooms around the country, that 70% of instructional time was spent in "teacher talk" with less than 1% being spent with student interaction. It would seem that new instructional strategies are badly needed, regardless of computers. Perhaps computers will act as the catalyst needed to bring about this change.

The last item or constraint mentioned by Jones and Woodhouse (1988) was a basic lack of knowledge about how computers work, how to operate them, or how to use the available software. Most computer training sessions for teachers are brief, held away from the work site with little hands-on experience, and usually have no follow-up. Additionally, many times due to lack of facilities, practice is virtually impossible.

To expand upon the last constraint, not only do teachers lack knowledge about the basics of computers and technology, they are not usually familiar with the more recent technological developments. One example would be

networked computers which have been referred to by Abbott, Brennan, and Quick (1989) as the third revolution in computing behind only the mainframe and the personal computer. Equipment such as laser disks, CD ROMs, interactive video disks, Date Show LCDs, and the telecommunications items are becoming more accessible and common each day. There is much for educators to become aware of and learn to use.

In summary, the literature review done by the writer supports the problem. As the agents of change in society, educators must be aware of the latest trends in technology and sufficiently trained in order to impart the information to their students.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

Goals and Expectations

The following major goals and outcomes that were projected for this practicum will now be described. The first goal was to assist faculty and staff members in becoming aware of the potential educational benefits of computer networking. A second goal was to assist the same educators in developing proficiency in the use of computers. These faculty and staff members would also be exposed to teaching strategies and computer software appropriate for use in their particular area of expertise.

As a final result, it was expected that as faculty and staff members became increasingly computer literate, they would use available computers with more frequency than previously.

Expected Outcomes

By the end of the implementation period, the participants would be able to list the educational benefits of networked computers to be measured by a post-assessment and hands-on activities (see Appendix E for complete assessment).

By the end of the implementation period, participating faculty and staff members were projected to demonstrate higher levels of comfort with basic computer literacy. These skills are summarized below:

A. Turning computer on, off, opening a file, closing a file, and saving a file.

B. Operating a word processing program and printing a document.

C. Operating a data base program/spreadsheet program and printing a document.

D. Operating a computer which is part of a networked system of computers.

These objectives were measured by a pre-assessment and a post-assessment and by the hands-on activities (see Appendix E for complete assessment).

It was projected that by the end of the implementation period, the media specialist (who monitors the school computer lab) would report the lab being used at least two class periods each day by faculty members with their classes. This was measured by a weekly sign-up calendar housed in the media center.

By the end of the implementation period, the participants would also exhibit familiarity with software content and function in the various curriculum areas. This was measured by the completion of a software evaluation in

the participant's area of expertise (see Appendix F for software evaluation form).

By the end of the implementation period, a projection that participants would exhibit familiarity with teacher management or productivity tools such as an electronic gradebook, quiz maker, and desktop publisher was made. This was measured by hands-on activities requiring the creation of required documents in all three areas.

A peripheral goal was to transmit collaborative or cooperative learning (two or more people working together on a common goal) strategy skills to the participants. The participants worked in teams of two people, one computer novice teamed with a colleague who had more advanced skills. Measurement occurred in two ways: a question asking if the participant used co-operative learning as a teaching tool was on the pre and post-assessment and extra in-service hours were offered for participants willing to do coaching (a form of cooperative learning) on recently learned computer skills. The participants choosing this option are keeping documentation of meetings with their coaching partner. This documentation will serve as a measurement of the percentage of participants who elected to further use cooperative learning to reinforce computer skills learned in the teacher in-service (see Appendices E for complete assessment form).

Measurement of Outcomes

The knowledge of educational benefits of networked computers was measured by a short answer question given on the pre-assessment and post-assessment (see Appendix E for complete assessment form). The question was open-ended, asking the participant to list the benefits of networked computers in the educational setting. This type of question forced the participant to write in short answer form which reflected their level of understanding of the network system. If a "yes" or "no" answer were required, many might have checked "yes" without true understanding of the system.

The performance of teacher functions on the network was measured by hands-on activities and a question on the pre and post-assessment. The hands-on activities included: logging into the teacher management menu, establishing class files, putting the various software programs into the students' menus, and knowledge of how to report student grades as the various software programs are done. The activity was projected to take approximately an hour to complete (see Appendix E for complete assessment).

These hands-on activities were printed and submitted as required work. Requiring these activities to be done on the computers reflected the skill of the computer user in all the areas mentioned above. If the participant understand the instruction given, he/she was able to produce the required activities.

The teacher's level of comfort with basic computer literacy was measured with a survey in the form of a check list. This check list was in written form and took less than five minutes to complete. It covered such items as availability of computers, frequency of use, type of use, and prior training. Also included was a section on skills such as the ability to open, close, and save files, use word processing programs, data-bases, and spreadsheets (see Appendix D for complete survey).

The number of periods that the school computer lab was in use was measured by a sign-up calendar sheet. The sheet had such things as the day of the week, the date, the periods that the lab was open, and a space for the teacher's name. Also included was space to request any particular software needing to be used from the media center collection. The sheet took no more than one minute to complete and was housed in the media center which is adjacent to the computer lab. The calendar was supervised by the media specialist who kept the records from month to month for the purpose of comparison. This calendar allowed the writer to make accurate comparisons of usage.

The familiarity with software content and function in the various curriculum areas was measured by the completion of a software evaluation in the participant's area of expertise (see Appendix F for complete evaluation). Requiring the participants to do an evaluation requires an

"in depth" look at the software in order to analyze its value.

Familiarity with teacher management tools was measured by hands-on activities requiring the ability to use the various programs such as the electronic gradebook, quiz maker, and desktop publisher. Using the programs involved opening and closing files, as well as saving and printing them. In some cases, participants were asked to use the accessory known as a mouse to assist them in the various functions. These activities were projected to take no longer than an hour each to finish upon completion of teaching activities centering on each individual management tool. The printed activity was used as a measurement tool. Upon successful completion, it indicated true understanding of the computer network and the ability to operate the system.

The peripheral goal of transmission of teaching strategy skills using computers was measured in two ways. There was a question on the pre and post-assessment regarding the use of cooperative learning as a teaching strategy (see Appendix E for complete assessment). Also the participants choosing to do coaching for an additional ten hours of in-service credit were asked to keep documentation sheets of meetings with their coaching partner.

Mechanism for Recording Unexpected Results

The writer kept a journal during the implementation period. Any activity concerning the practicum was entered. Also entered was any new note-worthy activity in the technology arena. This included actions by the technology team (as the writer is a member of that team), work in the computer labs, school activities (i.e. new uses of technology), and happenings in the district and community.

Participant input and evaluation was asked for informally at the end of classes two through ten. Participants also did a final evaluation of the training for the Teacher Education Center. The final evaluation asked for input on the relevance and quality of the instruction. The results of these various evaluations, kept in the journal, indicated some unexpected events (see Appendix G for Teacher Education Center evaluation form).

Participants were also asked to formulate their own goals as a word processing activity and continually assess as to whether they were accomplishing their goals.

The writer also monitored the effectiveness of the training informally through inviting verbal feed-back from participants. Asking for constructive criticism on a one-to-one basis made the participants feel comfortable enough to be honest about suggestions for improvement. All feedback was recorded in the journal.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Solutions

The problem at the writer's school was three-fold. Many faculty members and administrators were unaware of the potential educational benefits of the networked system of computers installed during the 90-91 school year. The advantages and operations of the system were not clear. The curriculum area software had not been explored. To compound the problem, other computers in the school available for student and teacher use were not being used adequately or wisely.

In the literature review, networked computers have been touted by Abbott et al. (1989) as the third revolution in computing, after the mainframe and the personal computer. Mainframes were the original type of computer: very large, cumbersome, and unavailable for individual use. Next came the personal computer, allowing individual use and even individual ownership as prices became affordable. Now the network is the third revolution in this age of electronic computing.

As Bryson (1990) indicates, organizations must constantly be sensitive toward any new trends which may influence them. Computers, particularly networked

computers, are definitely a trend which is having and will have a tremendous impact in the American educational arena.

Yet as Kelly (1990) laments, American school systems have been painfully slow in reacting to the new technology. This is a nationwide problem being reflected at the writer's school. Kelly's ultimate goal would be educators teaching basic skills by realizing and utilizing the potential of technology in the classrooms of America.

How to realize this goal was the crux of the problem being dealt with in this proposal. The writer's experience with computers over an eight year span produced some definite ideas on the difficulty of educator's acceptance of computers and the changes accompanying them.

The writer has noted that it is extremely difficult to surrender complete control to a piece of machinery. There are so many "if's" when one gives up control. What if my computer breaks or there is a power surge while I am doing this project which has taken a great amount of time and effort and the completion of which is vital to my career? What if I do something wrong? One hears all kinds of horror stories about forgetting to save or accidentally erasing information.

Surrendering control is an issue which can be accomplished in two ways. The preferred sequence of events would be many unhurried, positive experiences leading to a sense of confidence with computers. This would allow a comfortable transition to the world of technology. The other

way is when the change is dictated and comes swiftly with no thought given to the human factors involved.

The incorporation of computers into teaching has transpired in both ways. Unfortunately, in the majority of schools it has been a case of computers appearing in the classroom and teachers being expected to begin using them.

Knowing that many educators do not have a sense of confidence and competence with computers, the vision of what was to be accomplished in this practicum was clear. An exploration of the literature offered many solutions in reaching the goal. Jones and Woodhouse (1988) suggested using a Stages of Concern type of questionnaire at the beginning of any training on computers. This information allows the instructor to better understand the comfort levels of the participants. The rationale of the authors is that faculty members come with varying levels of experience and feelings concerning computers. This type of pre-test helps the instructor of teacher training to meet the needs of all the participants. The participants themselves also feel more comfortable and less threatened by the computers.

The authors (Jones and Woodhouse, 1988) also mentioned several other items essential in planning for training. A school should have a total school development plan for technology. Too often things are done in a piecemeal fashion. The training segment of the plan should be sequential: the operation of the hardware or equipment coming first, the software second, and the appropriate

teaching strategies third. Lastly, they felt that the use of computers should be subtly integrated in schools with such things as card catalogues and student records. They also indicated that perhaps being obliged to use a computer lab a half hour a week might be advisable.

Berger and Novak (1991) echoed several authors when they suggested that all educators must have convenient access to a computer either in their office or in their room. Too often this is not the case: the computers are located in a lab away from the classroom. All the training that a teacher may have with computers will not become part of their knowledge bank unless they have the opportunity to practice what they have learned.

While being trained in the use of networked computers, the teacher should have access to a computer that is linked to the network for practice purposes. A computer which is part of a networked system can't be taken home and still utilize the central system software unless a modem is used. In addition,many times the in-service training is held in a site different from the worksite.

Since few schools have introduced networked computers, practice in many places will definitely be a problem. Where networks do exist, there may be a problem similar to the one at the writer's school. While the network is there, it is only available for practice two periods a day. Two-thirds of the other teachers are teaching during these periods,leaving only one-third who

could utilize the available computer time. The only time the remaining teachers could practice on the network is before or after school.

The writer advises one further step in this area which has been done for several years at the writer's school. School managers can facilitate the speed with which teachers become comfortable with stand alone computers by allowing them to take computers home whenever possible. This could be done over weekends, long holidays, and during the summer months with regular personal computers. It could be done daily if the school had laptop computers available for checkout.

Tarwater (1990) insisted the networked system of using technology is the most efficient and effective way of delivering software into the classroom. He also stressed that the network allows the instructor to focus on the technical and instructional integration necessary to successfully implement the use of the computer in the classroom.

Lee (1991) suggested that teacher's workshops be offered after school hours for in-service credit, and that each school have a paid resource person providing support for other staff members. The writer would also suggest that teachers be offered the added incentive of being paid to take workshops when budgets allow.

It is also a definite advantage having the workshops offered at the job-site of the participants. The

convenience encourages more participants. The actual times of the workshop can be reflective of that particular school's time schedule whereas if teachers from other schools are involved, those schedules would have to be considered. This might result in waits of an hour or more before the beginning of the workshop after school hours.

Tobin (1987) indicated that training should always be at the option of the teacher, and that it shouldn't be an end in itself. He felt that follow-up activities should be scheduled after initial training. Certificates of completion for the participant and confirmation letters are also recommended in the article.

While doing research for this paper and in the past year while doing a pilot project with networked computers, the writer had some additional ideas to be considered when dealing with this problem. Since the skill of working collaboratively with others is one necessary for students to learn and also for teachers to possess, would it not be sensible to have teachers working together in collaborative groups or pairs while doing training on computers? Some teachers are more advanced in their use of technology. These educators are usually willing to share their knowledge with others, and this teaching strategy allows that to happen. This has the added advantage of contributing to a non-threatening environment during instruction; one feels more comfortable asking for help on a one-to-one basis. The

educators would be modeling the same collaboration that they can use as part of their teaching strategy.

Having substitute teacher funds available thereby allowing participants taking computer training an opportunity to observe collaborative learning among students already using the computers would be extremely useful. It would also enable in-service participants to see any other teaching strategies being used by educators experienced in the use of computers in the classroom.

From the writer's experience, these visitations would be advantageous to teachers and to students as well. Students are very pleased to be able to share their enthusiasm with others. The students are drawn to networked computers like a magnet; there is no motivation necessary to get them to work on the networked computers. Creativity also seems to flourish both in the writing skills areas as well as visual aides to accompany assignments. This includes illustrations, charts, graphs, and tables.

Not only are the students tremendously motivated by the networked computers, they are usually very quick to learn the operation of new software and subject area coursewear. Many come to the writer's grade level with advanced computer skills and are very anxious to use them to help others, including the teacher. These students are definitely a resource which educators could tap thereby giving themselves the gift of time to give more help to students who need it. As Weir (1989) said, "Teachers need to feel comfortable in

not being the sole provider of knowledge. They need to be prepared to learn from students,to learn with students" (p. 66).

Weir (1989) went on to say that her work has shown how computers can match learning situations to a student's learning style. The writer has observed the appeal of computers to students who normally are not successful in school because they are not motivated. In doing learning style inventories to determine whether a student learned better auditorally, visually, or kinesthetically (hands-on); the writer discovered that students with the latter learning mode were the most unmotivated in the traditional school setting. When access to computers was provided, the lack of motivation was a thing of the past. The students with the hands-on learning style were perfectly willing to use the word processing program to produce homework in all their subjects. This homework was not usually done prior to using the computers. They also did the required work in the educational software for the various disciplines.

Critical thinking skills have also been deemed as extremely important in the "world of work". As Sculley (1990) indicates: "But in the Information Age we want these people to make decisions, to have critical thinking skills to analyze data and make judgements on the basis of that analysis." (p. 4). These skills can easily be developed through the use of computers in the classroom. Much software is available which directly, or in some cases

indirectly, deals with these skills. In a teacher in-service training program, an exploration of such software would be essential.

Other important types of software are teacher management tools such as grade books and quiz programs. This software allows the teacher more time for actual instruction, using the computer to do the tedious work of scoring and recording homework and tests, as well as making up exams. Software which allows the teacher to "bookmark" or keep track of exactly what a students has done is very important.

The discussion of software also leads to another important facet of computer awareness-that of what is available in the telecommunications area. With the addition of a simple phone modem, a telephone line, and the appropriate software, the world is opened up to students and teachers alike. According to Beals (1991): "Networks afford opportunities for conversation across space and time in ways different from those found in other channels of communication" (p. 74). Two examples of student communications networks are "Kidwire" and "Kidnet". Among teachers, "Ideas" is one network; many other networks are available as well. The important thing about telecommunication networks is that they can also become the framework for cooperative learning among teachers and students alike. It is extremely exciting to be able to

share ideas and resources with people living across the world.

Description of Selected Solution

On the basis of the preceding research with solutions and suggestions noted, how could a visionary school leader put these ideas into practice? What could be attempted at a particular school which is representative of many schools across the nation but unique by virtue of its individual characteristics?

Because many teachers have been able to get by without using computers in their teaching, a perception has been formed that computers are not essential in the education of students. The writer was convinced that the first objective of any program would be changing these perceptions by an awareness of the importance of using computers in the classroom to benefit both the teachers and the students.

How was this done? It was introduced through a presentation and demonstration during a routine faculty meeting. The presentation was planned in order to arouse interest in technology: telling why it is vital for educators to incorporate technology in the classroom and demonstrating all the exciting software, strategies, and new hardware equipment presently available. After staff members were thoroughly impressed with the world of technology, an announcement was made regarding teacher in-service training

so that they too could learn to use all the technology equipment in the way demonstrated.

The teachers received 30 hours of in-service salary credit for taking the class. An optional 10 hours of credit was designed to make cooperative coaching very attractive. All classes were held at the writer's school for the convenience of the staff, and due to the availability of the only network setup of its kind in the school system.

Although participation in the training class was voluntary, other incentives were designed or could be designed to encourage participation. Such things as requiring teachers to use a computer lab at least once a week or offering to place teacher workstations in teacher's classrooms that have taken the training might be used. An incentive used by the author to encourage teachers to bring classes into the existing lab was to offer substitute coverage for teachers who signed up to use the lab most often.

What steps would the person in charge of the training have to take in preparation for such an undertaking? The first step was to plan with the school's technology committee and the administration ensuring that such training was reflective of the goals of the entire school. The writer is an active member of the technology committee, having authored an eight step strategic plan for technology at the school in the past few months. The plan was a

reflection of the committee's philosophy after input from the staff was considered.

The district's Teacher Education Center (TEC) was also contacted to be sure that such training is in keeping with county philosophy. Goals and objectives for the training were arranged cooperatively with TEC.

In summary, this program, Improved Technology Skills for a Middle School Faculty Through In-service Training, was a series of 10 in-service training workshops on the use of networked computers, with an introductory presentation to arouse interest and some follow up activities. The training was done in conjunction with the school system's teacher education center (TEC) and was held at the writer's school on the day of the week and at the time indicated by the prospective participants as being most convenient for them.

Upon successful completion of the ten week program, the teachers, staff members, and administrators received 30 in-service credits toward salary enhancement and/or state recertification. An additional 10 hours is currently being done by participants working together in pairs. They are coaching each other, putting into use some of the practical management tools learned in the training. All credits may be used toward state recertification in all teaching areas. These additional hours of coached collaborative learning require documentation. At the last class session, participants received two certificates of completion, one for their records and the other to be sent to the district

personnel office for inclusion in the participant's personnel file.

The participants were faculty, staff, and administration members from the writer's school. Usually courses involving the TEC are advertised throughout the county, thereby involving educators from other schools. The response to the initial survey indicating interest in the course, however, was excellent and 21 participants from the writer's school signed up for the class. It was decided that this was a sufficient number for the class. This represents roughly 33% of the entire faculty who volunteered to take the class.

The sessions were held at the writer's school and team area. The area consists of four classrooms with a total of 30 computers, four teacher workstations, and four printers (see Appendix B for complete description). The sessions were held after school hours in blocks of three hours weekly beginning in October and ending in December. The calendar and time was arranged after surveying the participants for their preferences.

In doing preliminary checking concerning the feasibility of such a program, the only difficulty encountered by the writer involved temperature control in the rooms. The southeastern United States is hot during the months of October and November, and there are no windows in the school. It becomes obvious that air-conditioning was necessary for at least a part of the time. Apparently the

air-conditioning system is rather antiquated in that in order to provide four rooms with cool air, the entire school had to be air-conditioned at great expense.

The writer made all the necessary arrangements. This included planning the sessions and team teaching with another teacher from the writer's team who is an expert in the technical area of computers.

Making the arrangements included several areas. These arrangements included meeting with the technology committee and the administration for approval of the practicum ideas. Secondly,a meeting with the district Teacher Education Center was initiated to determine feasibility and assignment of credit hours. Arranging for the team area to be air-conditioned after school was a major concern in times of tight budget restraints.

Additionally, due to severe financial constraints during the present school year, a grant was written requesting funds for instructor stipends and necessary materials such as floppy disks, transparencies, and copy paper. This grant was submitted to a local school foundation which gives grants in the amount of $500 for new, innovative projects.

After all approvals were obtained, the writer established the necessary state-mandated course objectives, strategies, and assessment measures as the training was taught under the auspices of the Teacher Education Center.

The state requires one objective for each three hours of class instruction time. This was done in cooperation with the Teacher Education Center (see Appendix H for complete objectives).

The remaining major task to be accomplished was the planning of the specific lessons to be taught. This was done in cooperation with the teacher who assisted the writer in the area of technical expertise.

Report of Action Taken

The following information summarizes the actions taken during the implementation of the proposal. These actions were designed to accomplish the goals and objectives of the practicum as described previously.

MONTH 1

Week 1

Meetings with the McIntosh Technology Committee and the principal were held to explain the goals and implementation plans of the proposal. Input from the two sources was received and permission was given to initiate the implementation.

A telephone conference with Nova University was initiated to obtain permission to write a grant. The grant, from a local public school foundation, paid a stipend

to the writer and colleague for the teaching of the in-service program.

A meeting took place with the Teacher Education Center (TEC) to obtain permission to implement the training. Specific objectives were planned cooperatively as required by the TEC and the Florida State Department of Education.

Several informal planning sessions were held with the colleague who assisted the writer during the in-service training.

Week 2

The writer scheduled a technology presentation during a faculty meeting. Preparations also were begun on the pre-assessment activities in cooperation with TEC (see Appendix H for complete objectives).

The grant was written requesting $500 (maximum amount available) to provide the teaching stipend. It was submitted to the Sarasota Public Schools Foundation, Incorporated.

Inquiries were made regarding copyright permissions. Two written requests for permission were prepared and sent.

Lesson plans and various step by step computer lab activities were prepared in cooperation with the writer's co-teacher.

Week 3

The technology presentation was delivered at the faculty meeting. One purpose of the presentation was to promote awareness of the implications of technology in the classroom and the teaching strategies necessary to use technology effectively.

The second reason for the presentation was to advertise the teacher in-service training being planned. Information regarding the course was given out to the entire staff. A deadline was set for returning the enrollment form and participant questionnaire (see Appendix D for complete survey). Input was also solicited regarding days and times for the training sessions; the idea being to hold the class when it was most convenient for the majority of participants.

The writing of the proposal for the practicum was completed and sent for approval.

Week 4

The enrollment information, described in week 3, was analyzed and the dates and times of the classes were set based upon this information.

Due to the extremely warm weather, it was necessary to air condition the classrooms being used for the training for three hours weekly. A meeting was held with the school's

facilities department to make the necessary arrangements for the air conditioning.

Since the air conditioning normally shuts off at 2:10 P.M. and because the system is antiquated, it was necessary to air condition the entire school on those days; there are approximately 60 classrooms in the school. This additional cost of approximately $1200 in a year of tight budget restraints was an important item. The head custodian made the requests and did receive the proper permissions from the county office.

The writer began keeping a daily journal of all activities pertaining to the practicum.

Confirmation letters explaining times, dates, materials etc. were prepared and given to all staff members who applied for the in-service training.

A representative from IBM (International Business Machines) is assigned to the writer's school as a troubleshooter for the IBM hardware. Mention was made of the training being planned; IBM responded that they would like to provide refreshments for the first class and attend as well.

MONTH 2

Week 1

Work was continued on preparations of lesson plans and materials were duplicated. Transparencies were also prepared as visual aides for the classes.

The use of the LCD (liquid crystal display) was initiated in the writer's regular eighth grade classes for practice purposes with the plan of using it for the in-service classes. This piece of equipment allows the use of the computer in conjunction with overhead projection for teaching purposes thereby maximizing the use of all the existing software contained on the network.

Week 2

Approval from the writer's practicum advisor was received for the implementation of the in-service training. Notification of the grant award in the amount of $500 was also received.

Final plans and preparations were made for the first class. Large visual charts were prepared with the objectives and agenda for the class displayed for the participant's use. This method was used for all the classes.

Week 3

The first three hour class of the 10 week in-service training was taught. Three observers attended: two IBM representatives and the school principal.

An announcement was made that the writer and teaching colleague would be available for a half hour after school daily to offer support and time for practice on the network. Also, the participants who have planning time during the first two periods of the day were invited to come to the instructors' rooms for assistance as the students are gone those two periods. The writer also invited members to observe classes in session on a drop-in basis.

Through the use of a cooperative learning technique and the results of the participant's questionnaire, novice computer users were paired with more technically advanced participants in a coaching type of situation.

Following the class, the two instructors met to evaluate the class and make the necessary adjustments to the plans for the next class.

The use of the daily journal was continued for the duration of the practicum implementation.

Week 4

The second class was taught. An announcement was made regarding an additional ten hours of in-service credit available through TEC. This was done at the suggestion of the Staff Development Specialist at TEC to encourage teachers coaching one another. Interested participants were given documentation logs to keep, indicating times, dates, and subjects of coaching sessions.

The writer's daily journal was kept and two planning sessions were held with the writer's teaching colleague to evaluate and plan.

Notes of thanks were written to the custodial and cafeteria departments and IBM for their cooperation concerning the in-service.

MONTH 3

Week 1

The third class was taught. It became evident that the hands-on lab activities planned were taking longer than planned. The agendas and objectives for the first two classes were too lengthy. The planning for future classes will reflect longer time slots for lab activities.

A technology committee meeting was held. The author attended and the training was discussed and in-put was requested as all the committee members were taking the class. The status of the computer lab was discussed. At the suggestion of the writer, it was decided to pursue the idea of a monthly drawing held during the monthly faculty meeting for "substitute periods." The two winners, whose names had been drawn from a pool of computer lab users, would be entitled to a free period while someone substituted for them. The writer volunteered to organize it.

Week 2

The fourth class was taught allowing more time for hands-on activities. A cooperative learning activity was used to review two journal articles, one pertaining to teacher coaching and the other on networked technology.

Evaluation of class 4 and planning for class 5 took place as well as daily journal entries.

Week 3

The fifth class was taught. Evaluation of class 5 and planning for class 6 took place. Daily journal entries were also kept.

The 6 week practicum report was prepared and mailed to the writer's advisor.

The plans for the monthly drawings were finalized. Two administrators will do the substituting. The media specialist will prepare the names of all the computer lab users during the previous month for the drawing at each faculty meeting.

Week 4

The sixth class was taught. Evaluation of the class and previous classes indicated that not all the objectives could be covered. Too much was planned for the amount of time available. The Excelsior Quiz Maker, one of the objectives, proved to be too complex for novice computer

users. Too much time was spent on trying to teach it. Adjustments were made in expectations amd in planning for the last few classes.

The daily journal was kept and a completion checklist of the required four assignments was posted for participants. This was to ensure that the work was completed in a timely fashion.

MONTH 4

Week 1

The seventh class was taught. Evaluation of the in-service training and planning for the eighth class was completed. The daily journal was kept.

Several participants started working on the network computers during the school day. This correlated with the setting of a deadline for completion of all hands-on activities. The deadline was reflective of the TEC guidelines for work completed during the training.

Week 2

The eighth class was taught; all hands-on activities were completed and turned in by the participants. Planning for the ninth class was completed, and the daily journal was kept.

Week 3

The ninth class was taught; a cooperative learning activity was used to review for the post-assessment. Evaluation procedures were discussed. Participants were encouraged to continue for the additional ten hours of credit by continuing to work as a coaching team after the completion of the ten week in-service.

The writer prepared the project summary of the in-service training for the grant to meet the deadline set by the Sarasota Public Schools Foundation Incorporated.

The class was not held for two weeks due to the winter holiday break when schools were closed.

MONTH 5

Week 2

The last class was taught. The post assessment was given and graded to ensure that all participants had received a grade of 80% of better, the grade required by TEC (see Appendix E for complete assessment). Copies of the completion certificates were given to the participants. The writer also offered to forward copies of the certificate to the school district's personnel office for inclusion in their personnel file.

A deadline was set for the additional 10 hours of coaching documentation.

Week 3

The preparation of the practicum report was begun.

CHAPTER V

RESULTS, DISCUSSION AND RECOMMENDATIONS

Results

A major goal of this practicum was to assist 21 members of the faculty, staff, and administraton in becoming aware of the potential educational benefits of computer networking through in-service training. This was measured by comparing the results on a pre-assessment and post-assessment (see Appendix E for complete assessment). All participants demonstrated an 80% minimum mastery on the over-all score for the post-assessment to indicate success. The actual item on the assessment required a listing of the benefits of networked computers.

In addition, participants were projected to demonstrate higher levels of comfort with basic computer skills. These levels were measured by 80% minimum mastery on the following items appearing on the post-test and/or print-outs of hands-on activities:

A. Turning computer on, off, opening a file, closing a file, and saving a file.
B. Operate a word processing program and print a document.
C. Operate a data base program, spreadsheet, gradebook, or quiz program.
D. Operate a networked computer system (LAN).

Another projected result was: as staff member participants became increasingly computer literate, they would use available computers with more frequency. The projection was made that the existing computer lab at the writer's school would be used a minimum of two class periods a day for the duration of the in-service course.

As a final result, it was projected that participants would be exposed to teaching strategies and appropriate software for their discipline. The teaching strategy exposure would be measured in two ways: the number of people signing up to do cooperative coaching and by a question on the pre and post-assessment. The exposure to software would be measured by the successful completion of a software evaluation.

Addressing the first goal, the pre and post-assessment results of participant's knowledge of benefits of networked computers: the objective of the practicum was successfully met. Eighty percent minimum mastery of the total post-assessment was required of each participant. Comparing the pre and post-test results: the pre-test indicates that 5 of the 21 participants (24%) demonstrated 80% mastery when asked to list the benefits of network computers. The post-test results substantiate that 19 of the 21 participants (90%) demonstrated 80% mastery. The net change in the number of participants showing mastery was 14 people (66.6% of the total number.)

The pre and post-assessment results in the area of comfort with basic computer literacy and the comparison of the scores for each of the four areas being tested will now be discussed. The passing minimum mastery score for each area was 80%.

In the operation of hardware (turning the computer on and off; opening, closing, and printing a file) 100% of the participants demonstrated mastery in the post-assessment (up from 71% in the pre-assessment for a growth factor of 29% or 6 participants).

Word processing skills (using the computer as one would a typewriter) showed 76% of the participants with minimum mastery level scores during the pre-assessment and a 100% rate during the post-assessment for an increase of 24% or, measured in participant numbers, 5 people.

The operation of a spreadsheet (use of the computer to store and compute numbers as in an electronic gradebook) showed 33%, or 7 participants, passing with an 80% score during the pre-assessment and 90% (19 participants) passing the post-assessment for an increase of 57% or 12 participants.

The last area measured was the operation of the network (LAN). Mastery at pre-assessment was attained by 29% (5 participants) while the post-assessment verified that 100% (21 participants) demonstrated mastery. This was an increase of 15 people or 71%.

The peripheral goal of exposing teachers to cooperative learning strategies was measured in two ways. First, participants were given the option of 10 additional TEC (Teacher Education Center) hours if they would coach each other in the use of technology in teaching. The number of participants choosing this option was 12 staff members or 57%. A completion date was set for March 1st. The second measure was a question given on the pre and post-assessment concerning whether cooperative learning was used by the participants as a teaching strategy. There was an insignificant change in the number of participants using this strategy from pre to post-assessment.

The second peripheral goal of having participants exposed to curriculum specific software was measured by participants initiative in evaluating software in their subject area. One hundred percent of the participants turned in at least one software evaluation sheet.

The final desired result of the practicum was increased usage of the existing computer lab at the writer's school. It was projected that the lab would be used at least two class periods a day for the duration of the practicum implementation. The figures were analyzed for the eighteen week first semester of the school year during which time the implementation took place.

These figures disclose that the usage of the lab exceeded the objective of the practicum. The over-all average for the frequency of classes using the computer lab

during the first semester was 3.4 periods a day. During the actual implementation period, this average rose to 4.4 periods a day. There was a slight decline in usage during weeks 12-14 and 17 which reflected the Thanksgiving and Christmas holidays.

Now that the writer's goals, methods of evaluation, and ensuring results have been presented, the TEC (Teacher Education Center) activity evaluations will be discussed. The evaluation form (see Appendix G for complete form) is required of all participants taking classes done in affiliation with the TEC. It included 5 questions requiring a ranking which is explained in Appendix G.

The results of that evaluation show that the participants strongly agreed, with a top rating of 4.0, that the in-service training was relevant to their needs. They also indicated strong agreement that the instructors were knowledgeable and prepared, and they (the participants) had the opportunity to be involved in the training and to ask questions.

A rating of 3.38 reflected that the participants still agreed, although not strongly, that the activity fulfilled its objectives, and that they felt prepared to apply what they learned.

Discussion

As the previous section indicated, the outcomes of each practicum goal were met and exceeded in all cases except the

use of cooperative learning teaching strategies in the classroom. The following paragraphs will be theorizing on why the goals were met and exceeded in most cases.

The awareness of benefits of networked computers is very obvious once a participant sees what the computers are capable of doing. Immediately the novice can see the tremendous time-saving potential in the area of bookkeeping plus the intrinsic motivation that computers seem to hold for students. There is also the operational ease of a network system; no loading of individual software and trying to find out where a student left off yesterday. All of these things, and many more are done automatically.

The exceeding of practicum goals in participants' comfort level with basic computer skills was presumably due to four components of the in-service training. These include: step-by-step written instructions, several hours of hands-on activities, individualized help from the instructors, and coaching partners.

The peripheral goal of exposing teachers to cooperative learning skills was accomplished in the training. Several lessons were taught using cooperative learning groups complete with the assignment of jobs in the groups, establishing rules, and assigning tasks to be achieved within the groups. The goal was not set that the participants would begin using cooperative learning as a teaching (or learning) strategy; it was hoped that this would happen, however.

Fifty-seven percent of the participants did choose to use cooperative learning as a learning strategy as indicated by the number who signed up for the additional 10 hours of coaching. The writer presumes that two factors were involved in this decision by the participants. The first is comfort level; one feels more comfortable when paired with another person usually as "two heads are better than one." The other reason was the true desire to become proficient in the skills that were being taught. The more practice one has, the more likely the skill will become a part of the user's knowledge base.

On the assessment question asking participants if they were currently using cooperative learning as a teaching strategy, there was a difference of one participant from pre to post-assessment. This could be explained by the fact that it represents a total change in teaching. One must go from the lecture style of teaching, which most people have used for years, to small groups working together. It requires more careful planning done well in advance, a tolerance for noise in the classroom, and new approaches to the grading of papers.

The second peripheral goal of having participants exposed to curriculum specific software was met by 100% of the participants. This happened because there was a course requirement that one evaluation be done by each participant.

There was time given, however, for perusal of the many curriculum-specific software programs available on the network.

The frequency of computer room use doubled the writer's expectations during the practicum implementation period. This can be attributed in part to the participants feeling more comfortable with basic computer skills. It also is important to realize that other faculty members were using the lab. Over-all use of the lab was encouraged by the possibility of winning "sub" time during the monthly drawing.

Moving to the descriptive information in Appendix J; this information summarizes the participant's responses to the documentation survey given prior to the in-service training. These 21 teachers and staff members are experienced educators with average of 19.5 years of teaching experience; 61.9% have a master's degree as well.

Over 85% had more than one year of experience with computers. Approximately 76% also indicated that they had had formal training on the use of computers, although 95.2% had not had training with networked computers (LAN systems).

Despite the training, the number of years of exposure to computers, and the availability of computers (57.1% had at least one in their classroom and the school computer lab available to all teachers and classes); 61.9% of the participants indicated that they were relative beginners

when asked about their computer literacy. Only 38% gave themselves an "intermediate" computer literacy level.

Why did this well educated, experienced group of educators rank themselves in this manner prior to the implementation of the practicum? Is it lack of confidence? Lack of positive experiences with computers? Whatever the reasons, this practicum helped the participants to transcend this lack of confidence as is evidenced by the post-assessment evaluations.

How was this done? Many recommendations from the literature were used. A most critical issue was what Johnson and Woodhouse (1988) refer to as a lack of support for teachers willing use computers. This was addressed in several ways in this practicum. The instructors allowed for guided practice during class and had an "open door" policy in their classrooms during the school day. Arrangements were made with the media specialist to have volunteers assisting in the computer lab. Plans are being made to offer a support group once a week for any faculty or staff member caring to attend.

Another constraint mentioned by Woodhouse and Johnson (1988) is a lack of knowledge concerning instructional strategies when using computers. This issue was addressed by the writer using cooperative learning techniques during the teaching of the in-service. This was received enthusiastically by the participants and requests were made for copies of materials used by the writer.

The third area cited by Johnson and Woodhouse(1988) is a basic lack of knowledge about how computers work, how to operate them, and how to use software. The major goals of this practicum were to improve computer skills for both regular stand-alone computers and networked computers. The results of the post-assessment indicate that the goals were met. The participants indicated (on the TEC evaluation activity) that the step-by-step written instructions, hands-on computer time, and individual attention received were very valuable in this area.

The literature also suggests that it is important for in-service instructors to have participants do a self-assessment as to their present comfort level and as to what they would like to work on during the course of instruction. This was done by the documentation survey and was used to help identify goals for instruction.

Lee (1991) suggested that computer training be done after school hours for in-service credit. This practicum, done in the suggested way, had the added advantage of being at the participant's worksite and held on the day and time chosen by the majority of participants.

Tobin (1987) spoke of training being at the option of participants and that follow-up activities be scheduled. This in-service training was optional and follow-up activities are being planned.

All of the above suggestions were utilized when planning this practicum. As a result, 21 faculty and staff

members are more comfortable using computers and have an understanding of the benefits of a network system of computers. It also is likely that they will continue to use computers both for personal use and for student instruction.

There were several unanticipated outcomes as a result of this practicum. One result was a decision by the administration (as recommended by the Technology Committee) that only faculty who had completed the in-service training would be eligible to have network computers installed in their rooms as the computers become available. In other words, the training provided by this practicum became a pre-requisite for network computers in teachers' classrooms.

A second unexpected result was the tremendous increase in the use of the school computer lab. As explained previously, the lab has gone virtually unused for several years. Now it is averaging 3.4 class periods of use out of a six period day. Whether this increase is due to new-found skills or because of the possible reward of substitute time or a combination thereof can only be surmised. An interesting aside is a recent offer by the district superintendent to be a substitute for a half day as part of this on-going result of the practicum.

Another unexpected issue was that of participants who did not have typing skills prior to the practicum. They had great difficulty with the in-service training because much of their attention was absorbed in trying to type rather

than what to type to get the necessary results on the computers.

Prior to this practicum, the writer had not taught adult education. Now, with the practicum in-service training over, the writer and teaching colleague have been invited by the school district's technology department to teach the class again. The second session will be open to all district employees as there is no other training available on the use of network technology in the school system.

The district technology department has also requested the assistance of the practicum writer in the evaluation of $365,000 technology grant received by the county for the 91-92 school year.

Reiterating Kelly's lament (1990) regarding American education's excruciatingly slow reaction to technology; it is a problem nationwide as well as in the writer's school system. Computers are available but not being used to their full potential in education. Kelly's goal is having educators realize and utilize the potential of technology in the classroom. The realization of this goal succinctly summarizes the outcomes of the this practicum.

Recommendations

The following recommendations could possibly enhance the results of future teacher in-service training in the area of computer technology, including the necessary skills required to run a local area network system of computers (LAN).

1. Typing skills should be a pre-requisite for this type of training. Individuals who do not have typing skills have great difficulty learning the new skills.

2. There should be no more than six or seven participants per instructor unless coaching pairs are formed. These pairs would include one novice computer user with a more experienced user.

3. On-going support for participants should be planned after the initial training is over.

4. Every effort should be made to individualize instruction for participants. This includes locating curriculum specific software.

5. Each school should have a strategic plan for technology which includes both short

and long term goals. In-service education should be included in these goals.

6. In-service teacher training in the area of technology should be on-going in each school. It should be held on-site making it convenient for participants and allowing them the opportunity to practice on networked systems.

7. Computers should be available to teachers and other staff members for check-out during vacations. Laptop computers could be checked out on a daily basis.

8. Teachers taking in-service training in the area of technology should have substitute funds available enabling them to visit selected classrooms to observe how computers are being successfully used.

Dissemination

This practicum will be the subject of an article presently being written for submission to an educational technology journal.

After being shared with the school administration at the writer's school, it will also be sent to the Teacher Education Center. The recommendation section will be

directed to the district superintendent and the technology department.

A copy of appropriate sections will be sent to the National Resource Center for Middle Grades/High School Education for possible inclusion in a symposium being offered in the spring. This symposium will focus on the global needs and critical issues facing education in the 21st century.

The recommendation section of the practicum will be used as the basis for a grant proposal sponsored by the University of South Florida Center for Excellence in Mathematics, Science, and Technology.

The writer will be presenting a demonstration of the use of networked computers at the Florida State Conference of English Teachers in the fall of 1992.

It is expected that the writer's services will continue to be requested by the local school board to train teachers in the use of networked computers. Other innovative technology such as CDRoms and videodisk players will be included in the training.

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APPENDICES

APPENDIX A

DESCRIPTION OF WRITER'S COMPUTER NETWORK

McDays of Thunder

ESCRIPTION OF PROJECT:

he project is a network of IBM computers and software in four classrooms hich enables students to learn and teachers to teach and handle dministrative tasks. There are student-computers, teacher-computers, a etwork-server-computer, a school-office-computer and a district-office-omputer in the network (Please refer to side 2 of this sheet for diagram).

TUDENT

he student computers are IBM PS/2's (Model 25) with color and sound. here are 6 or 7 in each room and they are connected by wire to each ther, to the teacher's computer, and to the server. The server contains he instructional software and student rosters. The student "signs-on" to he courseware as assigned by the teacher and his/her activity is ndividually tracked in the server. Students may also use their computer eparately as if they were not on a network. Each classroom has printers or student work, and they may print their work on any printer.

EACHER

he teacher has an IBM PS/2 (Model 30-286) in the classroom. This is onnected to the student's computer, the server, the other teachers' omputers, and the school office. Although this computer is networked, it an still be used by itself. When the teacher's computer is "on" the etwork, it is an instructional tool and can be connected to a large screen onitor for class viewing. When the teacher's computer is "on" the line to he school-office computer, student information and memos can be sent and eceived. Each classroom has a printer on the network that allows the eachers to print there or to a printer in another classroom or office.

CHOOL

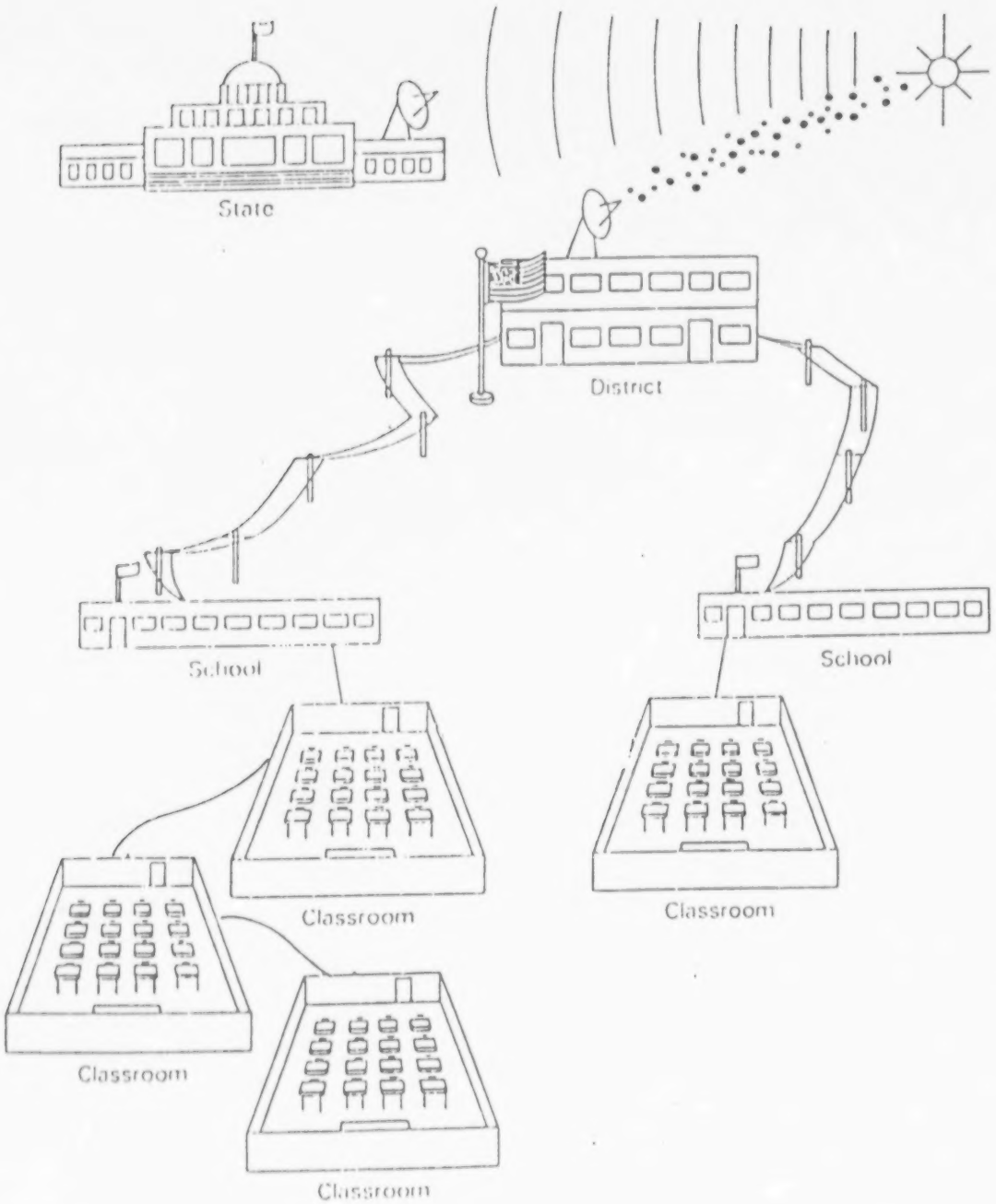
he school has a mid-sized computer (IBM AS/400) connected to the eachers' computers by wire and the District's computer through ommunication lines. These connections enable the teachers to send and eceive student information, grades, memos and other electronic-mail from heir classrooms to the school's-office computer and through to the istrict-computer. This networking enables teachers and administrators to ommunicate information to their counterparts at other schools.

ISTRICT

he District has a larger computer (IBM AS/400) with the capability of ommunicating to and from each school and to the State Department of ducation. This unit is the "hub" of the system between schools and allahassee.

APPENDIX B

PICTORAL REPRESENTATION OF THE SCHOOL DISTRICT'S COMPUTER NETWORK SYSTEM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APPENDIX C

SCHOOL'S TECHNOLOGY NEEDS AND GOALS

Appendix C

TO: All Faculty

FROM: Technology Committee

DATE: May 30, 1991

SUBJECT: Five Year Technology Needs and Goals

The following needs and goals were identified by the technology committee at our last meeting. Please list any additional technology items that you feel are important for our technology future. After looking over the list, please rate each item by importance. Rating scale is 1-5 (#1=most important, #5=least important). We will use your ratings to create a five year plan of implementation. Please return to a committee member by Tuesday, June 4. Thank you!

_____1. Computers for individual student use in media.
_____2. Card Catalogue terminals on teams.
_____3. 1/2 VCR for each team or grade level.
_____4. Bank of computers for each team plus software.
_____5. Dozen laptop computers for students/teachers.
_____6. Software to support all curricular areas.
_____7. Video cameras.
_____8. Mixing and editing equipment for videos.
_____9. Sound room with lighting for video production.
_____10. Video disk players/TVs on a cart-each grade.
_____11. CD-ROM (s) for the media center.
_____12. CD-ROM (s) for each networked team.
_____13. Low heat overhead projectors to use with LCDs.
_____14. MacIntosh, Apple 11GS, and Tandy/IBM computers for use with interactive video disks.
_____15. Science measurement instruments:PH probe.
_____16. Electronic marquee for the cafeteria.
_____17. Network entire school to access AS400.
_____18. Phone modem access: outside line $120.00.
_____19. Satellite dish.
_____20. Computer replacements to maintain the system.
_____21. Computer furniture.
_____22. Purchase of new equipment for business lab.
_____23. Software purchased with textbook funds.
_____24. Software previewing scheduled periodically.
_____25. Laser disk per team.
_____26. Teacher in-service: awareness training, network training, teaching strategies using computers.

27. One scanner per team.
28. 2 Data show LCD panels per team.
29. School-wide catalog of existing software to include: hardware requirements, grade level, and subject area.
30. Soliciting funds: MIPs, corporations, school community.
31. Public awareness of computer usage at McIntosh.
32. Centralization of inventory: printer ribbons, printer paper, etc.
33. Re-inker for printer/typewriter ribbons.

Please rate any items that you add below.

APPENDIX D

FACULTY SURVEY

APPENDIX D

TO: All Faculty

FROM: (Technology Committee Representative)

DATE: June 1991

SUBJECT: Computer Use-Network Awareness Questionnaire

Our students must be prepared to go forth into the world of technology, and it is our job to prepare them to do this. This year our school piloted a special network technology project. Since we are the first school in the county to have such a system, it would seem that there is a need for faculty awareness and teacher training in this area of networked computers. The purpose of this questionnaire is two fold: to document this need and to gather information on what would be most useful to YOU if this need is established.

Each faculty member is asked to fill out the survey and return to _____ before leaving for the summer. Your time and effort, especially at this time of the year, will be GREATLY appreciated. MANY THANKS!!!!

PLEASE COMPLETE THE FOLLOWING. The average time to complete this survey is five minutes. Most questions can be answered by a check mark, number, or "yes" or "no".

COLLECTION DATA

1. Grade level ____6th ____7th ____8th ____ESE
2. Female _____ Male_____
3. Age: ____20-29 ____30-39 ____40-49 ____50 or above
4. Highest degree earned:
   ____Bachelor ____Masters
5. Number of years teaching _____
6. Number of years in present school _____

COMPUTER USAGE(school, home, other business)

1. Which catagory best describes your use of computers? non-user_____ novice_____
   intermediate_____ advanced_____

2. If you do use computers, how many years have you used them? ____less than a year____one year
   _____two years ____3-4 years _____5 years or more

3. Have you ever received any formal training in using computers? _____yes _____no

4. Have you received any formal training in the use of a networked computer system? _____yes _____no

5. Do you own a computer? _____

6. If you do have a computer at home, please check how you use it. ____word processing ____spread sheet ____data base ____with a phone modem _____games ____graphics _____OTHER (please explain) _____

7. Are personal computers available at school for your use? _____yes _____no

---

---

8. Do you have a computer as part of your classroom equipment? _____yes _____How many? _____no

9. If you answered "yes" for number 4, please answer these questions.

   A. How frequently do you use your computer? _____daily _____frequently _____occasionally _____almost never _____never

   B. What do you use the computer for? Please check appropriate spaces. ____student instruction _____games _____teacher management(grade book, preparing tests etc. _____word processing _____in conjunction with a LCD overhead

COMPUTER-TECHNOLOGY KNOWLEDGE

Which of these "technology terms" do you know? Please indicate with the following code: U (unknown), F (familiar), or K (known:can define with confidence).

_____LCD
_____CD Rom
_____Laser disk
_____Interactive video
_____electronic mail
_____National Geographic "Kid's Network"
_____networked computer systems
____teleconferencing
____"on-line"
____mouse
____hard drive
____telecommunications

Are you aware of the benefits that a networked computer system offers? _____yes _____no

If you answered "yes" above, please list the main benefits.

TEACHER TRAINING-COMPUTERS

Which of these areas would be MOST USEFUL TO YOU in an inservice training program? Please check the appropriate items.

_____Learning of the benefits of networked computers over the "stand-alone" variety

_____Step by step instruction in the use of the computers which are networked

_____Learning about the latest "technology" equipment, particularly what we have available at our school

_____Learning about the "networked" educational software that we have at our school, especially in your curriculum area

_____Teaching strategies for incorporating computers into instruction

_____Other

If a need is established for teacher training with the networked system, would you be interested in taking this training if it were offered at our school?

_____yes _____no

AGAIN, THANK YOU FOR YOUR VALUABLE TIME AND EFFORT. HAVE A GREAT SUMMER.

APPENDIX E

TEACHER INSERVICE PRE- AND POST ASSESSMENT

Name_____ Subjects Taught_____

Grade Level_____

COMPUTER SKILLS

Directions: If you have a working knowledge of the skills, check the "Yes" box. This would indicate that you do use or could use the specific skill at least once a week. Otherwise, check the "No" box.

1. **On, Off, Open, Close, and Save.** YES ☐ NO ☐
Can you turn the computer on and off, load a disk into the machine, open a file in most programs, close a file, and save data onto a disk?

2. **Work Processing.** YES ☐ NO ☐
Can you operate a word processing program and print your document on a computer printer?

3. **Data-base, Spreadsheet, Gradebook, or Quiz Program.** YES ☐ NO ☐
Can you operate or use on a regular basis any one or more of the above listed types of computer applications programs?

4. **Networked Computer Systems (LAN).** YES ☐ NO ☐
Can you operate or use a computer which is part of a networked system of computers?

COMPUTER USE

Directions: If you use computers for any of the uses listed below, check the "Yes" box. The assumption is that you use or could use the computer for that use at least once a week. Otherwise, check the "No" box.

1. **Computers as a Teaching Tool.** YES ☐ NO ☐
Do you use computers as a teaching tool?

2. **Computers as a Personal-use Tool.** YES ☐ NO ☐
Do you use computers as a tool either at home or at school?

OTHER QUESTIONS

1. **Cooperative Learning** YES ☐ NO ☐
Do you use cooperative learning (small groups seated and working together) as a teaching strategy?

BEST COPY AVAILABLE

2. Benefits of Networked Computers
Can you list three benefits of Networked computers?

a._____

b._____

c._____

3. Barriers to Use of Computers
What do you feel is your greatest barrier to not using computers more frequently?

_____

4. Prior Experience
If you have had prior experience with computers, please indicate what type of computer you feel most comfortable using. Mark your choice with an "X".

_____Apple or Apple-compatible hardware

_____IBM or IBM-compatible hardware

5. Reason for taking this Networked Computer Technology Class.
Please indicate with an "X" the reason that you are taking this class.

_____ Recertification

_____ Interest in computers

_____ Both

_____ Other (please explain) _____

_____

APPENDIX F

SOFTWARE EVALUATION FORM

APPENDIX F
TEACHER COURSEWARE EVALUATION FORM

NAME:_____

SCHOOL:_____

SOFTWARE INFORMATIONS:_____

NAME:_____

VENDOR:_____

CURRICULUM AREA:_____

EVALUATION:

	HIGH.....LOW
CONTENT:	
Appropriate for use in conjunction with other technology (T.V., Overhead, etc.)	5__4__3__2__1__
Factually Accurate	5__4__3__2__1__
Pedagogically Sound	5__4__3__2__1__
Language/Terminology Accurate and Appropriate	5__4__3__2__1__
Appropriate Feedback to User	5__4__3__2__1__
Requires Decision Making/Problem Solving	5__4__3__2__1__
Helps student with their classwork	5__4__3__2__1__
INDIVIDUALIZED PACING:	
Variable Speed	5__4__3__2__1__
Variable Level	5__4__3__2__1__
EASE OF USE:	
Directions Clear	5__4__3__2__1__
Easy Access/Exit	5__4__3__2__1__
Help Available Easily	5__4__3__2__1__
SCREEN PRESENTATION:	
Legibility (Easy to Read)	5__4__3__2__1__
Layout	5__4__3__2__1__
Color/Graphics	5__4__3__2__1__
Sound	5__4__3__2__1__
DOCUMENTATION:	
On-line	5__4__3__2__1__
Printed Materials	5__4__3__2__1__
OVERALL EVALUATION:	
Total Ranking	5__4__3__2__1__
Grade Level Objectives covered	5__4__3__2__1__

ADDITIONAL COMMENTS:_____

_____

_____

_____

_____

_____

APPENDIX G

TEACHER EDUCATION CENTER ACTIVITY EVALUATION FORM

TEACHER EDUCATION CENTER

ACTIVITY EVALUATION

ACTIVITY NAME: _____ DATE(S): _____

YOUR COMMENTS ON THIS ACTIVITY ARE VERY IMPORTANT TO US.
PLEASE TAKE A FEW MOMENTS TO ANSWER THESE QUESTIONS.

4 = STRONGLY AGREE 3 = AGREE 2 = DISAGREE 1 = STRONGLY DISAGREE 0 = NO OPINION

Please circle one number for the first five questions:

1. The activity fulfilled its description or objectives.	4	3	2	1	0
2. The activity was relevant to my needs and interests.	4	3	2	1	0
3. The instructor/facilitator was knowledgeable and prepared.	4	3	2	1	0
4. The participants had an opportunity to get involved and to ask questions.	4	3	2	1	0
5. I feel prepared to apply what I learned in this activity.	4	3	2	1	0

6. What I valued most about this activity:

7. What I would like to see improved in this activity:

8. What I still need in addition to or as a follow-up to this activity.

Other comments:

THANK YOU! • PLEASE RETURN FORMS TO TEACHER EDUCATION CENTER via PONY MAIL •

APPENDIX H

TEACHER INSERVICE OBJECTIVES

COMPONENT NAME: NETWORK TECHNOLOGY 86

COMPONENT NUMBER: 52224200

MAXIMUM INSERVICE POINTS: 30

GENERAL OBJECTIVE:

This course will assist teachers in becoming aware of the potential educational benefits of computer networking. It will offer the opportunity to develop proficiency in the use of networked computers through hands-on activities. Teachers will have exposure to teaching strategies and coursework appropriate for their grades and discipline.

SPECIFIC OBJECTIVES:

Participants will be able to:

1. Turn on the computer, boot-up, print a document, store and save.

2. Distinguish three benefits of a network computer system (LANS).

3. Complete a software evaluation for their discipline.

4. Use microsoft works as a productivity tool in:
   A. Word processing
   B. Data Base
   C. Spreadsheet

5. Report grades using Excelsior Grade (an electronic gradebook) by:
   A. Creating class titles
   B. Entering grades
   C. Editing configuration
   D. Generating reports

6. Generate a test using the Excelsior Quiz.

7. Use desktop publishing to create a variety of school documents with Express Publisher.

8. Describe the teacher's role on the network.

9. Perform teacher functions on the network.

10. Demonstrate the security function on the network and explain the importance of security.

11. List the copyright restrictions for the network system.

Page 2 #52224200

DESCRIPTION OF ACTIVITIES:

In order to accomplish the objectives, the participants will:

1. Attend lecture by instructor using LCD overhead.

2. Participants will work cooperatively (in pairs--novices with intermediate/advanced users).

3. Participate in hands-on activities using the networked computers.

4. Engage in on-going support by instructors with a possible mentor program.

EVALUATION:

1. The participant will be assessed for mastery by:

   A. Teacher survey, comfort level of computer literacy
   B. Hands-on activities
   C. Submission of a product (test, class lists, grade sheet)
   D. Submission of software evaluation form
   E. Logging on to the network

2. Participants will demonstrate increased knowledge of eighty (80) percent of the specific objectives as measured by objective-based pre- and post-tests.

3. All participants will be asked to complete the Teacher Education Activity Evaluation form upon component completion. Instructors and consultants will be asked to complete a similar form for instructors.

APPENDIX I

FACULTY PRESENTATION OUTLINE

IMPLICATIONS OF HIGH TECH IN THE CLASSROOM

I. ISSUE 1 - HISTORICAL DEVELOPMENT - TECHNOLOGY

A. CHANGING WORLD DUE TO TECHNOLOGY

B. CHANGING JOB MARKET

C. NEED FOR RESTRUCTURING EDUCATIONAL SYSTEM

1. EFFECTIVE TEACHING

2. COMPUTER SKILLS

II. ISSUE 2 - TEACHING STRATEGIES WITH COMPUTERS

A. INTRODUCTION
   1. EXPERT ASSISTANT
   2. INFORMATION PROVIDER

B. TIME SAVER
   1. MANAGEMENT TOOL

C. TEACHING TOOL
   1. INTEGRATION OF CURRICULA
   2. TEACH LITERACY
   3. USE OF SOFTWARE
   4. INDIVIDUAL DIFFERENCES
   5. COLLABORATIVE LEARNING

APPENDIX J

DESCRIPTIVE INFORMATION ON PARTICIPANTS TAKING INSERVICE

DESCRIPTIVE INFORMATION ON PARTICIPANTS

ASSIGNMENT	
9.5%	6th Grade
33.3%	7th Grade
14.5%	8th Grade
9.5%	ESE (Exceptional Student Education)
19.0%	
14.2%	Other(Administrators/Staff)
GENDER	
85.7%	Female
14.3%	Male
HIGHEST DEGREE	
61.9%	Master
33.3%	Bachelor
4.8%	High School
AVERAGE YEARS OF TEACHING	
19.5 YEARS	
YEARS USING COMPUTERS	
14.3%	< 1 Year
4.8%	1 Year
19.0%	2 Years
23.8%	3-4 years
38.1%	>= 5 years
EXPERIENCE WITH COMPUTERS	
9.5%	Non-user
52.4%	Novice
38.1%	Advanced

n=21

DESCRIPTIVE INFORMATION ON PARTICIPANTS

HAVE HAD FORMAL COMPUTER TRAINING

76.1%	Yes
23.9%	No

HAVE HAD FORMAL NETWORK COMPUTER TRAINING

4.8%	Yes
95.2%	No

COMPUTERS AVAILABLE FOR USE IN SCHOOL SETTING

82.3%	Yes
11.8%	No
5.9%	Don't Know

WHERE COMPUTERS LOCATED

38.1%	One in room
19.0%	Two or more in room
42.9%	Only in lab

n=21